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10/582,231	06/09/2006	Hiroyuki Shioiri	292020US3PCT	2849

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EXAMINER	
MOMPER, ANNA M	
ART UNIT	PAPER NUMBER
3657	

NOTIFICATION DATE	DELIVERY MODE
12/10/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/582,231	SHIOIRI ET AL.	
	Examiner	Art Unit	
	ANNA MOMPER	3657	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/16/2009 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 7-9, 11, and 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

4. The hydraulic motor 550 of the invention, utilizes a moving direction converting mechanism 551, such as a threaded screw portion, wherein the rotary motion of the hydraulic motor is transferred into an axial motion for actuating the movable sheave. However, the applicant also discloses a hydraulic pressure chamber 57 which builds up pressure thus providing a pressing force of the movable sheave to push the movable

sheave toward the stationary sheave to ensure traction of a belt wound between the two sheaves. In order for the hydraulic pressure chamber to actually push the movable sheave to provide a pressing force, the hydraulic pressure chamber would require a relative rotation between the motor and the pulley outer peripheral portion to move the sheave, therefore it is not sufficiently described in the specification how the hydraulic pressure chamber can provide this pushing force requiring the use of the moving direction converting mechanism while the motor is also utilizing the moving direction converting mechanism, such that one can work without interfering with the operation of the other.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5-8, 11, 12, 15-18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steuer (GB 929326 A, herein after Steuer '326). in view of Yoshida (US 2002/0183146 A1).

As per claims 1 and 4, Steuer '326 discloses a belt type continuously variable transmission (Fig. 1), comprising:

two pulley shafts (1, 2) arranged in parallel a predetermined distance apart from each other (Fig. 1);

a movable sheave (4, 6) on each pulley shaft, the movable sheaves being able to slide in an axial direction on the pulley shafts;

a fixed sheave (3, 5) arranged on each pulley shaft so as to face the moveable sheave on each pulley shaft, the fixed sheave and the movable sheave that face each other on each pulley shaft together forming a groove there between; and

a belt (11) wound around the grooves between the movable sheaves and the fixed sheaves that face one another,

a motor (24, 25) that rotates in normal and reverse directions to drive one of the movable sheaves in the axial direction of a pulley shaft of the one of the moveable sheaves,

a moving direction converting mechanism (14, 16, 20, 22 and 15, 17, 21, 23) that converts force in the direction of rotation, which is a driving force of the motor, into force in the axial direction,

wherein the motor is provided in a hollow portion of the one of the moveable sheaves, that is located opposite the groove (Fig. 1), the hollow portion including an inner wall surface,

wherein the motor includes an outer rotor (38, 39, 28, 29, 30, 31 Fig. 2) that is integrated with the one of the moveable sheaves and the outer rotor includes an outer peripheral portion disposed radially about the outer rotor.

Steuer '326 fails to explicitly disclose the moving direction converting mechanism being a moving screw portion (claim 4) and being disposed between the outer

peripheral portion of the outer rotor and the inner wall surface of the hollow portion of the movable sheave (claim 1).

Yoshida et al. discloses a continuously variable transmission having a fixed sheave (2) and a movable sheave (3) mounted for rotation about a pulley shaft (6) and wherein the movable sheave is moved toward or away from the fixed sheave to affect a change of transmission ration, and wherein said moving toward or away is actuated by means of motor ([0032]) which rotates gears (19, 20) and wherein the rotational motion of these gears is converted into an axial force by means of a ball-screw mechanism, wherein a threaded shaft (11) is coupled to the gearing via flange (16) and a nut portion (12) is coupled to the pulley via casing (8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the continuously variable transmission of Steuer '326 to include a moving screw portion disposed between the outer rotor, being the relatively moving portion of the motor, and the pulley, as taught by Yoshida et al., for the purpose of providing a mechanism for converting the rotary motion into an axial force and for the reduction of space.

As per claim 2, Modified Steuer discloses an integral rotating mechanism which rotates the motor integrally with the movable sheave (the motor is mounted to the shaft), and a relative moving mechanism that moves the motor and the movable sheave relative to one another in the axial direction (taught by Yoshida, and disclosed in claims 1 and 4 above).

As per claim 5, Steuer '326 discloses the motor (24, 25) is provided with an inner rotor (26, 27) which is integrated with the pulley shaft (Fig. 2) and the outer rotor which generates driving force by rotating relative to the inner rotor;

the pulley shaft is provided with a bearing that rotates the outer rotor relative to the pulley shaft (Fig. 1).

As per claim 6, Steuer '326 discloses a spline portion provided between the outer rotor and the movable sheave (Fig. 1).

As per claim 7, Steuer '326 discloses a hydraulic pressure chamber (32, 33) which pushes the movable sheave toward the fixed sheave using hydraulic pressure is provided in series with the motor in the axial direction (Pg. 5, Ln. 42-51).

As per claim 8, Steuer '326 further discloses at least one wall surface that forms the pressure chamber is formed by the motor (Fig. 2).

As per claim 11, Steuer '326 discloses one of the pulley shafts (1) is a primary side pulley shaft and the other of the pulley shafts (2) is a secondary side pulley shaft, the movable sheave provided integrally with the motor is arranged on the primary side pulley shaft (Fig. 1), and a plurality of pushing mechanisms that push the movable sheave toward the fixed sheave are provided on the movable sheave on the secondary side pulley shaft (Fig. 1, a motor 25 and ball and ramp mechanism 13, 19, 21 is provided on the secondary pulley).

As per claim 12, Steuer '326 discloses at least one of the pushing mechanisms is a torque cam (Fig. 1, ball and ramp mechanism 13, 19, 21).

As per claims 15 and 16, Steuer '326 discloses a belt type continuously variable transmission (Fig. 1), comprising:

two pulley shafts (1, 2) arranged in parallel a predetermined distance apart from each other (Fig. 1);

a movable sheave (4, 6) on each pulley shaft, the movable sheaves being able to slide in an axial direction on the pulley shafts;

a fixed sheave (3, 5) arranged on each pulley shaft so as to face the moveable sheave on each pulley shaft, the fixed sheave and the movable sheave that face each other on each pulley shaft together forming a groove there between; and

a belt (11) wound around the grooves between the movable sheaves and the fixed sheaves that face one another,

a motor (24, 25) integrally provided with one of the movable sheaves and capable of driving said the one of the movable sheaves, the motor being rotatable in normal and reverse directions to drive said movable sheave

wherein the motor includes an inner rotor (26, 27) that is integrally assembled with a pulley shaft of the one of the moveable sheaves (Fig. 2) and an outer rotor (38, 39, 28, 29, 30, 31 Fig. 2) that generates driving force that drives the one of the moveable sheaves in the axial direction of the pulley shaft by rotating relative to the inner rotor,

wherein the outer rotor is provided with an outer peripheral portion disposed radially about the outer rotor (outer peripheral side of outer rotor) and the movable

sheave is provided with a hollow portion that includes an inner wall surface (inner peripheral side of inner sheave flange 38, 39).

Steuer '326 fails to explicitly disclose the moving direction converting mechanism being a moving screw portion (claim 16) and being disposed between the outer peripheral portion of the outer rotor and the inner wall surface of the hollow portion of the movable sheave (claim 15).

Yoshida et al. discloses a continuously variable transmission having a fixed sheave (2) and a movable sheave (3) mounted for rotation about a pulley shaft (6) and wherein the movable sheave is moved toward or away from the fixed sheave to affect a change of transmission ration, and wherein said moving toward or away is actuated by means of motor ([0032]) which rotates gears (19, 20) and wherein the rotational motion of these gears is converted into an axial force by means of a ball-screw mechanism, wherein a threaded shaft (11) is coupled to the gearing via flange (16) and a nut portion (12) is coupled to the pulley via casing (8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the continuously variable transmission of Steuer '326 to include a moving screw portion disposed between the outer rotor, being the relatively moving portion of the motor, and the pulley, as taught by Yoshida et al., for the purpose of providing a mechanism

As per claim 17, Steuer '326 discloses a hydraulic pressure chamber (50, 47, 51) which pushes the movable sheave toward the fixed sheave using hydraulic pressure is provided in series with the motor in the axial direction (Fig. 1).

As per claim 18, Steuer '326 further discloses at least one wall surface that forms the pressure chamber is formed by the motor (Fig. 2).

As per claim 21, Steuer '326 further discloses the outer rotate relative to the movable sheave (Fig. 2, Fig. 1, Steuer shows a bearing between the outer rotor and the pulley sheave, allowing for relative rotation of the rotor and the pulley sheave).

7. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steuer '326 (GB 929326 A) in view of Yoshida et al. (US 2002/0183146 A1) and further in view of Fritzer et al. (US 6,786,844 B2).

As per claims 13 and 14, Steuer '326 discloses all elements of the claimed invention as disclosed in claim 12 above, but fails to explicitly disclose an absorbing mechanism that makes the torque cam operate smoothly is provided on the fixed sheave on the secondary side pulley shaft or the movable sheave on the secondary side pulley shaft (claim 13) and a structure which changes the degree of absorption according to the speed ratio is provided in the absorbing mechanism (claim 14).

Fritzer et al. discloses a contact pressure regulation system (12) for a continuously variable transmission (10) in which a torque cam system (50, 52) is utilized on the output shaft, having a damping mechanism (322, 314,312) to ensure smooth operation and having a structure which changes the degree of absorption of the absorbing mechanism (314,316) according to the speed ratio (i, Fig. 12, Fig. 13, Col. 22, Ln. 15-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the continuously variable transmission of Steuer '326 to include a damping mechanism, as taught by Fritzer et al., for the purpose of reducing vibrations.

8. Claims 9-10 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Steuer '326 (GB 929326 A) in view of Yoshida et al. (US 2002/0183146 A1)and further in view of Steuer (US 4,350,491, herein after Steuer '491)

As per claims 7 and 17, in a second interpretation of Steuer '326, Steuer '326 discloses an oil chamber (32, 33) in the motor, however fails to explicitly disclose a hydraulic pressure chamber which pushes the movable sheave toward the fixed sheave using hydraulic pressure provided in series with the motor (claims 7 and 17).

Steuer '491 discloses a continuously variable transmission having a fixed sheave (3) and a movable sheave (4) and a motor (piston assembly, Fig. 2), disposed in a hollow portion of the movable sheave (Fig. 2) to actuate a movement of the movable sheave toward or away from the fixed sheave to affect a change in transmission ration, and wherein said motor is disposed serially and axially adjacent with a hydraulic pressure chamber (10) which pushes the movable sheave toward the fixed sheave in series with the motor.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the continuously variable transmission of Steuer '326 to include a hydraulic pressure chamber which pushes the movable sheave toward the fixed sheave using hydraulic pressure provided in series with the motor, as taught by Steuer '491 to

ensure sufficient pressure to engage the belt as well as reduce the required load of the hydraulic motor.

As per claim 8 and 18, Steuer '491 further discloses a wall surface (9) that forms the hydraulic pressure chamber is formed by the motor (Fig. 1, Fig. 2).

As per claim 9 and 19, Steuer '326 discloses the motor being a hydraulic motor. Steuer '491 discloses the motor being a hydraulic motor and an oil chamber in the motor (Fig. 2) and the hydraulic pressure chamber (10) are arranged facing one another in the axial direction across the wall surface formed by the motor (Fig. 1, Fig. 2).

As per claims 10 and 20, Steuer '491 further discloses the oil chamber and the hydraulic pressure chamber are connected to each other (in one interpretation they are connected in the sense that they share a wall, in a second interpretation they are on the same hydraulic supply line and are therefore connected).

Response to Arguments

9. Applicant's arguments with respect to claims 1 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA MOMPER whose telephone number is (571)270-5788. The examiner can normally be reached on M-F 6:00-3:30 (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Siconolfi can be reached on (571) 272-7124. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

am

/Robert A. Siconolfi/
Supervisory Patent Examiner, Art Unit 3657